REMARKS/ARGUMENTS

Claims 11 to 20 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claim 18 was objected to under 37 CFR 1.75(c) as being improper dependent form for failing to further limit the subject matter of a previous claim. Claims 11 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over EP Patent No. 0085553 to Sabol (hereinafter "Sabol") in view of U.S. Patent No. 5,835,550 to Van Swam (hereinafter "Van Swam").

Claim 18 is hereby amended to more particularly and distinctly claim the invention.

Reconsideration of the application is respectfully requested.

Claim Objections

Claim 18 was objected to under 37 CFR 1.75(c) as having improper dependent form for failing to further limit the subject matter of a previous claim. Claim 18 has been amended to correct a translational error. Support can be found in the Substitute Specification on page 9, lines 26 to 29, for example. Since the amendment is believed to place claim 18 in proper dependent form, withdrawal of the objection to claim 18 is respectfully requested.

35 U.S.C. 112 Rejections

Claims 11 to 20 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner alleges on page 3 of the Office Action that "the new limitation of 'wherein β quenching does not occur between the first and second forging stage,' is not supported in the instant specification." The Examiner further asserts that the specification teaches the opposite, i.e., that "the intermediate product 3' obtained from the first forging stage in the α + β phase can be subjected to a cooling stage of any type." (Substitute Specification, p. 8, lines 5 to 10).

However, β quenching is not just a cooling step, but rather involves a first step of first heating the alloy to a high temperature to bring the alloy into the pure β phase before a second

step of fast cooling of the alloy. One of skill in the art at the time of the invention would necessarily know that heating the alloy prior to the fast cooling of the β quenching would not be done using the method of the present invention because the initial heating step would cause the formation of non-negligible amounts of hydrides in the alloy. Since the elimination of the formation of hydrides is one of the main goals of the present invention (see Substitute Specification page 8, lines 21 to 26), one of ordinary skill in the art at the time of the invention would know that there would never be β quenching between the two forging steps of the present invention, i.e., it is inherent or intrinsic in the disclosure of the present invention that no β quenching is performed between the two forging steps.

Withdrawal of the rejection to claim 11 and dependent claims 12 to 20 under 35 U.S.C. §112, first paragraph is respectfully requested.

35 U.S.C. 103(a) Rejections based on Sabol et al.

Claims 11 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over EP Patent No. 0085553 to Sabol (hereinafter "Sabol") in view of U.S. Patent No. 5,835,550 to Van Swam (hereinafter "Van Swam").

Sabol et al. discloses "zirconium alloy intermediate and final products, and processes for their fabrication." (Page 1, lines 1 to 3).

Van Swam discloses "a process for fabricating [a] nuclear fuel rod cladding tube comprising β quenching a zirconium alloy billet." (See Abstract). The process includes "heating to a temperature in the beta range greater than about 1000°C. and rapidly quenching the billet to a temperature below the α plus β to a transformation temperature to form a martensitic structure; extruding the beta-quenched billet at a temperature between 600°C. and 750°C. to form a hollow; annealing the hollow by heating at a temperature up to about 700°C.; pilgering the annealed hollow; and final annealing the pilgered annealed hollow to a temperature up to about 700°C. to form a nuclear fuel rod cladding tube." (See Abstract).

Claim 11 recites "a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage, wherein β quenching does not occur between the first and second forging stage; and

extruding or hot rolling the forged ingot."

As admitted in the Office Action on page 5, Sabol et al. does not teach or show the limitation "wherein β quenching does not occur between the first and second forging stage" required by claim 11. Sabol β quenches after the initial forging. (See page 2, line 11 to 16). Van Swam fails to meet his limitation as well.

Furthermore, the intermediate β quenching and Sabol's second forging process identified in the Office Action would not be suitable for ingots of the claimed size and it is respectfully submitted that one of skill in the art would never use Sabol's second forging process with such ingots due to the undesirable formation of hydrides. The intermediate quenching of Sabol would imply a long reheating at a high temperature similar to the one which takes place in the prior art referenced in the specification, for bringing the ingot to a 1,000° to 1,100° C, which would cause the formation of the undesirable hydrides in an amount that would not be negligible for ingots of the claimed size. Also, hydrides may be formed during the quenching itself, due to contact of the hot product with water, also in an amount that would not be negligible for ingots of the claimed size.

Furthermore, one of skill in the art would not use different quenching media, as suggested by the Examiner. Other quenching media are not adequate enough in terms of quenching speeds. Water is the only possible medium sufficient to be used for β quenching, but has the drawbacks of contributing to hydride formation as discussed above. Moreover, the quenching operation itself is not the main or only source of hydride formation. Instead it is the long heating step which precedes quenching step in which water is captured from the atmosphere. Therefore even if the quench media was something other than water, hydride formation would still be a problem due to the long heating step prior to the actual quenching step.

Finally, there is no reason that one of skill in the art would modify the teachings of Sabol in view of Van Swam. Van Swam dissuades one of skill in the art from performing forging in the α + β phase, which teaches away from the present invention. Therefore there is no reason or motivation for one of skill in the art to modify the teachings of Sabol with those of Van Swam.

Withdrawal of the rejections to claim 11 and the dependent claims 12 to 20 under 35 U.S.C. § 103(a) as being unpatentable over Sabol et al. in view of Van Swam is respectfully requested.

CONCLUSION

The present application is respectfully submitted as being in condition for allowance and applicants respectfully request such action.

Respectfully submitted,

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